REMARKS/ARGUMENTS

This paper is submitted responsive to the office action mailed April 18, 2007. Reconsideration of the application in light of the accompanying remarks and amendments is respectfully requested.

In the aforesaid action, the Examiner rejected claims 26-29 under 35 USC 112, second paragraph, based upon the term A(j). This term refers to the fraction of P(j) with respect to P(i) and P(j) combined. The term appeared in claim 1 as originally filed. The language from claim 1 as originally filed has been added to the specification, and the specification now supports use of the term A(j) to refer to a fraction of P(j) with respect to P(i) and P(j) combined. This addresses the Examiner's concerns with respect to claims 26-29, and does not constitute the addition of new matter to the specification since this subject matter was in claim 1, at least, as filed.

Claims 50 and 51 were rejected under 35 USC 112, second paragraph, as indefinite based upon the term "swelling agent". Initially, it is noted that claim 51 does not contain this term, nor does it depend from any claim which contains this term. Thus, this rejection should be withdrawn as it relates to claim 51, as this claim does not at all contain the language complained of by the Examiner.

As to claim 50, this claim does contain reference to a swelling agent. It is submitted, however, that a person of ordinary skill in the art to which the present invention pertains would readily know what a swelling agent is. Note that Wikipedia contains a definition for the term swelling as follows:

> **Swelling can mean:**
>
> **. . .**
>
> **In engineering:**
>
> **-Increase of volume of material, due to absorption of a solvent (common for plastic polymers)**

Based upon the foregoing, it is clear that the swelling agent is a material used to increase the volume of material. Thus, this term is used as it is commonly understood in the industry to which the invention relates. Thus, it is submitted that claim 50 is not at all indefinite, in that a person of skill in the art could determine the exact metes and bounds of this claim. Reconsideration of this rejection is respectfully requested.

Turning to the art rejections, the Examiner considers US 6,300,398 B1 (Jialanella) as the closest prior art stating that Jialanella discloses a composition of a linear or substantially linear low density polyethylene and wax, including low molecular weight polyethylene wax.

However, Jialanella neither discloses nor suggests at least the following features of present claim 13:

a) within the molecules of the first polymer P(i): existence of crystallisable sequences A having a degree of polymerisation DPs(P(i)) > 20;

b) the second polymer P(j) being molecules having a degree of polymerisation with 20 < DP(P(j)) < 500;

c) molecularly dispersed mixture of P(i) and P(j) and forming a network under heterocrystallization.

The features of present claim 13 and in particular the structural features a) and b) combined with the mixture/interaction feature c) result in mechanically strong articles when the polymer mixtures are solidified and with the additional advantage of reduced melt viscosity of the melted mixture during processing (e.g. injection molding).

In column 1, lines 43-45, Jialanella discloses hot melt adhesives comprising homogeneous linear or substantially linear ethylene polymers and refers to WO 97/33921.

Further, in column 13, lines 27-31 or in claim 8, Jialanella discloses that waxes useful in Jialanella's invention include

paraffin waxes, microcrystalline waxes, Fischer-Tropsch waxes, polyethylene waxes and by-products of polyethylene, wherein Mw is less than 3000.

Further, in column 1, lines 55-60, Jialanella discloses a polymer composition comprising a homogeneous ethylene / alpha-olefin interpolymer; a wax; and a nucleating agent.

Further, in column 2, lines 24-29, Jialanella discloses a hot melt adhesive composition comprising an olefin polymer; a nucleating agent; and a wax.

The expressions "homogeneous" and "interpolymer" are defined in the Jialanella patent (column 2, lines 36-38):

"homogeneous ethylene / alpha-olefin interpolymer which is an interpolymer of ethylene and at least one C3-C20 alpha-olefin".

Similar definitions can also be gleaned from WO 97/33921 which corresponds to EP 0 886 656 B1. The definitions of "interpolymer" and "homogenous" are given on page 5, paragraphs 28 and 29, respectively, of the EP patent:

an "interpolymer" is defined as a copolymer or a terpolymer or a higher order polymer, i.e. at least one other comonomer is polymerized with ethylene to make the interpolymer; and

"homogeneous" defines that any comonomer is randomly distributed within a given interpolymer molecule and that substantially all of the interpolymer molecules have the same ethylene/comonomer ratio within that interpolymer.

Both the Jialanella patent (for instance column 2, line 38) and EP 0 886 565 B1 (for instance page 5, line 30) define the alpha-olefin blocks/sections in the interpolymer as C3-C20 blocks/sections.

All this shows that throughout the combined disclosures of Jialanella and the referenced EP patent, there is no indication or suggestion to a) the existence of crystallisable sequences A having a degree of polymerisation DPs(P(i)) > 20 in the first polymer P(i) molecules and b) the second polymer P(j) being molecules having a

degree of polymerisation with 20 < DP(P(j)) < 500 according to the present invention.

Turning to the present invention, the polymer mixtures are quite different from the polymer mixtures according to Jialanella.

By molecularly disperse mixing of a first polymer having crystallisable sequences with a degree of polymerization > 20 and a second polymer having molecules with a degree of polymerization between 20 and 500, the present invention provides a polymer mixture with improved processability (lowering of the melt viscosity of the first polymer having larger molecules due to the presence of the second polymer having smaller molecules) and improved mechanical and thermal properties of the solidified mixture (formation of a network by physical cross-linking / hetero-crystallization between the larger and the smaller molecules). These heterocrystallites constitute "network points", i.e. regions where the molecules are linked to each other to form the network.

The superior mechanical strength is due to the fact that the crystallisable sequences in the macromolecules of the first polymer have a minimum size of more than 20 monomer units and the relatively small molecules of the second polymer have a size of 20 to 500 monomer units. This results in the formation of cross-linking heterocrystallites including a crystallisable sequence of a first macromolecule, a crystallisable sequence of a second macromolecule and a group of smaller molecules. These crystallites have a minimum size of more than 20 monomer units which guarantees a minimum stability of each cross-linking region and thus the superior strength of the polymer mixture after solidification.

The significance of molecularly disperse mixing according to the present invention can be seen from the relations shown in Figs. 1, 2, 3 and 4 between the concentration of the second polymer P(j) and various properties of the inventive polymer mixture.

It can be seen that irrespective of the mixing method (chamber

kneader 5 min; single-screw extruder; double-screw extruder) increases in modulus of elasticity, yield stress and breaking elongation of the solidified mixture are obtained and that a the same time, a reduction in melt viscosity (lowering of the melt flow index) is obtained.

Further, it can be seen that the increases in the above mechanical parameters are best achieved by the molecularly disperse (or at least nearly molecularly disperse) mixing process. Figs. 1, 2 and 3 show that there is an improvement of the increase in mechanical properties starting from modest mixing achieved by the chamber kneader with 5 min mixing time (smallest degree of molecularly disperse mixing) via the chamber kneader with 15 min mixing time to the best mixing by the double-screw extruder (practically molecularly disperse mixing).

This proves that only by the combined effect of features a), b) and c), a significant increase in the mechanical parameters E-modulus, yield stress and breaking elongation are achieved.

None of these structural features and measures are disclosed or suggested in Jialanella. In contrast, Jialanella even teaches away from the teaching of the present invention by defining small alpha-olefins as linear copolymers of ethylene and having only 3 to 12 carbon atoms, preferably 4 to 8 carbon atoms (column 16, lines 9-11).

Based upon the foregoing, it is respectfully submitted that independent claim 13 and all claims depending from it are not at all anticipated or obviated by any of the art of record, alone or in any valid combination.

An earnest and thorough effort has been made by the undersigned to address all issues in this application and to place the application in condition for allowance. If, upon consideration of this response, the Examiner is of the opinion that issues remain which can be addressed by telephone interview, the Examiner is invited to telephone the undersigned to discuss same.

A request for two month extension of time accompanies this paper, along with an authorization of the Deposit Account for the fee in connection with same. It is believed that no additional fee is due. If, however, any such fee or fee deficiency is due, please charge same to Deposit Account 02-0184.

Respectfully submitted,
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